EDITORIAL ARTICLES.

TETANUS: ITS NATURE AND ORIGIN.

Is tetanus essentially a disease of the blood or of the nervous system? Is it infectious or not? Is the tetanus of horses identical with that of man? These are questions which have long been before the profession; and for years there have been persons ready to give an affirmative, and others a negative answer to each of these questions. That tetanus is infectious in horses has been more readily and frequently held than that it is in man. I have heard of a series of 17 cases which occurred, one after the other, in the same stable. That it is infectious, or, rather, in some manner contagious, in man I have believed ever since I observed an epidemic of it in the West London Hospital, extending over several years prior to and including 1881. In November that year I delivered an address before the Abernethian Society, of which the following abstract appears in St. Bartholomew's Hospital Reports for the corresponding year (Vol. xviii, p. 399):

"He (the speaker) urged as evidence of tetanus being primarily a blood-poisoning, the almost constant fact of a wound being discoverable, the possibly constant fact of a wound having been present at some period of every case, the regularity of what might be termed the period of incubation in tetanus neonatorum, the regular order of the first appearance of its local symptoms (comparable to the method of invasion of a scarlatina rash), the (alleged) occurrence of a peculiar smell, the rise of temperature, the influence of climate, the recurrence of the disease endemically and epidemically. The structural changes in the cord, inasmuch as they have been observed to lie chiefly round the blood-vessels, also suggest a poison circulating in the blood." * * * "The changes in the kidneys, and the clear state of the mind are further evidences. So, also, to some extent, is the fact that children suffering from undoubted blood poisoning have convulsions, although adults have rigors. There is greater difference between 'con- ' convulsions' and rigors than there is between 'convulsions' and tetanus."

"Finally, a short notice was given of how an epidemic of tetanus at the West London Hospital was apparently eradicated by hygienic measures."

The conclusion of this last sentence should have read as follows: "by hygienic *and antiseptic* measures." For some years before and including 1881, the mortality of operation cases and compound fractures from tetanus at the West London Hospital had been quite extraordinary. I am unable to give the exact figures, but my colleagues of that time, as well as the house-surgeons will confirm the statement. In that year, at my request, a meeting of the medical council of the hospital was summoned to consider the question whether something could not be done to remove the pest. As a result, antiseptic methods of a far stricter kind, and antiseptic materials and appliances of an improved quality were introduced. Some months were occupied in bringing this about, owing to the dilatory nature of the government by committee. During these months two of my patients were attacked with tetanus and one of the two died. From that time to this, nearly six years, not a single patient of mine has been attacked with tetanus.

During the epidemic in question I noticed particularly that almost every patient with tetanus had at the same time symptoms of either local or general septic infection. There was either suppuration, or inflammatory redness, or lymphangitis, or something of the kind.

During the same unhappy years, there were scores of simple fractures, in some of which the bones were most severely crushed and splintered in the immediate neighborhood of large nerves, such as the ulnar. None of these had tetanus.

I am absolutely convinced that those who suffered did so in consequence of something which was conveyed to the wound, and that in some, if not all, of the cases which commenced in the hospital, the evil influence was implanted by either the house-surgeon, the dresser, the the nurse or the surgeon himself. As a proof of the latter statement may be taken one of my cases in which the patient was attacked after a sinus leading down to carious bone had been enlarged and the bone treated by gouging and the free application of pure carbolic acid. This patient could not have brought his infection into the hospital with him. As he recovered, it is probable that the infection was in his case slight.

Recently in France, Professor Verneuil bas put forward the hypothesis that *tetanus in man is derived from the lower animals*, which, of course, includes the idea of its being infectious. In the *Revue de Chirurgie* for October, 1887, is a long and comprehensive paper in which the distinguished French surgeon gives short and pithy abstracts of a large number of observations furnished to him by his compatriots. He arranges them in four series, illustrating respectively the four headings under which he classifies his remarks.

These headings are as follows:

1.—*Professions which specially expose wounded persons to the danger of contracting tetanus.*

2.—*Concerning the inoculation of tetanic virus by the instrument which inflict the wounds or by applications probably contaminated with this virus.*

3.—*The transmission of tetanus from the horse to man, from man to the horse, from man to man.*

4.—*Consideration of negative cases.*

Professor Verneuil had previously published his general views of the nature and origin of tetanus in the *Gazette hebdomadaire* and at the *Congress of French Surgery*. The article in the *Revue de Chirurgie* is devoted to the development of his opinions in detail, and to the registration of facts.

Extensive enquiries have been addressed to country surgeons and veterinary surgeons in France during the past year, and the result has been the collection of more than two hundred observations.

It is to be borne in mind that the set of questions sent out by Professor Verneuil appears to have implied a request that the relations between human and equine tetanus should form a special subject of examination. But even when these relations do not seem to exist they are to be noticed when intelligently looked for.

Among the 200 observations certain occupations of the sufferer are so common, and certain modes of receiving the injury so frequent that Mr. Verneuil feels driven to the conclusion that after different forms of accident, and in the case of persons of different professions, there is great inequality in the respective liability to contract tetanus. His object at present is to show that, given a case of human tetanus, there are two chances to one in favour of the possibility of tracing it to equine influences (de romanter jusqu'au cheval).

According to him, this equine influence is exercised in many ways, some direct, others indirect.

1. When a man is wounded by an instrument which has been used on a horse.

2. When he has been bitten or wounded by a horse.

3. When, being wounded, he has remained in more or less continued contact with a horse.

4. When he is wounded by a fall from horseback or from a vehicle.

5. When, being wounded in some way, his wound is contaminated by horse excrements or by earth impregnated with them.

6. When his occupation brings him into constant contact with horses, with their excrements or with earth impregnated with the latter.

Verneuil broadly divides his cases into *four classes*, as follows:

The *first* includes persons, by profession, habitually in contact with horses, such as car-men, farm-servants, stablemen, farmers, labourers, farriers, horse-dealers, veterinary surgeons, knackers, etc., and, supplementary to these, persons working regularly upon land cultivated with the aid of animal manures, and above all with horse dung, such as gardeners of various kinds, as well as navvies.

In the *second* category are placed persons, of whatsoever profession, whom chance has brought into passing contact with either healthy or sick horses; who have been wounded by these horses or by appliances used daily on or with the animals, *e. g.*, harness, whips, carriages, agricultural implements; or whose wounds have been soiled by horse excrements or by earth impregnated with them. In this class are included a long list of persons with tetanus after injury by horse-bites, kicks, dressings made with dung, street-dirt, stable-runnings, immersion of the wound in water from horse-ponds, cattle-troughs, etc.

In the *third class* are grouped all persons with tetanus who have been in relation, more or less direct with other persons (or animals) with tetanus. The study of these leads to that of the question of the transmissibility of tetanus from the horse to man, perhaps from man to the horse, certainly from man to man.

The *fourth class* includes the cases, still rather numerous, in which no relation, direct or indirect, can be traced between the wounded man, on the one hand, and, on the other hand, any man with tetanus, any horse sick or well, or any article connected with the soil.

M. Verneuil believes that negative cases will become more and more rare when observations are made more minutely and when it is better known what objects, animate and inanimate, may receive and preserve the tetanic virus. He is confirmed in this belief by the fact that when the observations sent to him have been recent and few in number, they have generally been in accordance with his theory, bu when, on the other hand, they have extended back for years and included a long series of observations, they have not been so confirmatory. M. Verneuil finishes this naïve paragraph with the statement that he has been accused of putting forward only such facts as appeared to support his argument, while keeping in the background such as were opposed to it. He proposes, however, to afterwards examine the latter class of facts with care, and says he shall do so "*en revanche.*" Would not gratitude have been a more suitable word than "revenge" here ?

A possible objection to M. Verneuil's investigation is that it practically ignores all the cases hitherto published and deals only with his own fresh collection. To this he replies that the study of infectious and contagious maladies is much more simple and much more fruitful in small centres than in great. He adds that no one can suppose that his friends would choose to send to him only such observations as would be agreeable. Perhaps not, but still there must be many people in rural France, as elsewhere, of a complaisant nature, and especially complaisant to persons of M. Verneuil's great position.

Returning now to the cases, it appears that

The first class form more than half the observations collected. This fact furnishes the strongest argument which as yet exists in favour of the theory. One hundred and eleven cases are included in this class, and a few lines are devoted to each. Want of space forbids the translation of them, one by one.

Many of them are very striking, for instance when the wound has been dressed with horse dung or when horses have died of tetanus in the same building a short time before the injury has occurred to the human patient. But no just idea can be formed of the value of these cases until one hears what M. Verneuil has to say respecting the cases which appear to negative his theory. These he promises to deal with in a future number.

At present he seems to have hurled his hypothesis in the face of critics and sceptics, as Douglas threw the Bruce's heart amid the Saracens. Crying "forward, brave heart," and shouting to the country doctors of France to follow, he charges to the rescue. This is one way of pursuing scientific truth, it is either sublime or ridiculous. The ultimate result will decide which. There seems to be much at present in favour of Verneuil's view, and his paper is well worth studying in connection with the experimental enquiries which other surgeons have been and are making into the nature and origin of tetanus.

C. B. KEETLEY.